PATENT ABSTRACTS OF JAPAN

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(71)Applicant : **RICOH CO LTD**

(72)Inventor : **HIRASAWA TOMOYASU**

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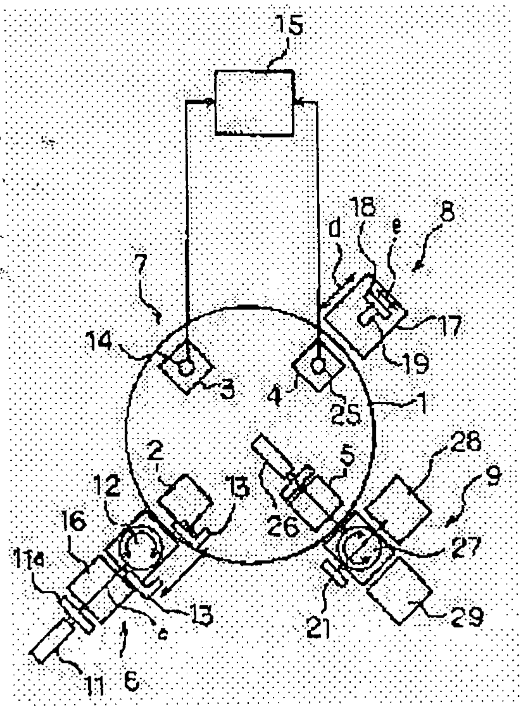
(54) LIQUID CRYSTAL PANEL INSPECTION APPARATUS



(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a liquid crystal panel inspection apparatus which is capable of treating a plurality of liquid crystal panels in parallel and shortening the time for inspection of the liquid crystal panels by installing a plurality of stations for carrying out different treatments to the circumference of a table and is capable of facilitating the layout of treatment apparatus and easily carrying out the inspection of different kinds by sorting the treatment apparatus to the respective stations.

SOLUTION: This inspection apparatus has the intermittently rotatable table 1, the plural stages 2 to 5 which are disposed on the table 1, the feed station 6 which is installed at the circumference of the stage, a detection stage 7, an inspection stage 8 and a discharge station 9. As a result, the plurality of stations which carry out the different treatments are installed at the circumference of the table 1, by which the parallel treatments of the plurality of liquid crystal panels and the shortening of the time for inspection of the liquid crystal panels are made possible. The treatment apparatus are sorted to the respective stations, by which the layout of the treatment apparatus is made

easy and the easy execution of the inspection of the different kinds is made possible.

LEGAL STATUS

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CLAIMS

[Claim(s)]
[Claim 1] In the liquid crystal panel test equipment which judges the predetermined defect at the time of no switching [of a liquid crystal panel] on the light, and the display pattern at the time of lighting automatically an intermission -- with a pivotable table and two or more stages prepared on this table The injection station supplied to said liquid crystal panel on said stage, and the detection station which detects the location of the electrode of the liquid crystal panel thrown into said stage, The inspection station which performs said defect of the liquid crystal panel thrown into said stage, and the judgment of a display pattern, Liquid crystal panel test equipment characterized by having the draining station which discharges the liquid crystal panel which inspection ended from said stage, and installing said injection station, a detection station, an inspection station, and a draining station in the perimeter of said table.
[Claim 2] A send means to send out one non-inspected liquid crystal panel at a time from the cassette which said injection station carries out predetermined spacing isolation of the non-inspected liquid crystal panel, carries out a laminating, and is contained, A direction adjustment means of an electrode to double the direction of the electrode of the non-inspected liquid crystal panel sent out from this send means, and the probe for panel lighting installed in said inspection station, Liquid crystal panel test equipment according to claim 1 characterized by having the positioning means which conveys the liquid crystal panel which is not inspected after this adjustment on said stage, carries out temporary justification, and carries out temporary positioning on a stage.
[Claim 3] Said detection station is liquid crystal panel test equipment according to claim 1 or 2 characterized by having an image pick-up means to picturize the image of the electrode of the non-inspected liquid crystal panel laid in said stage, an image-processing means to detect the location of the electrode of a liquid crystal panel from the image picturized by this image pick-up means, and a preservation means to save the location data obtained by this image-processing means.
[Claim 4] A probe migration means to contact this probe to this electrode after said inspection station performs positioning of the electrode of a liquid crystal panel, and a probe based on the data stored in the preservation means of said detection station, A signal generation means to impress a driving signal to the electrode of a liquid crystal panel through said probe, claims 1-3 characterized by having a judgment means to judge the predetermined defect and poor predetermined lighting at the time of no switching [of a liquid crystal panel] on the light from an image pick-up means to picturize the appearance of said liquid crystal panel, and the lighting pattern of an electrode, and the this picturized image data -- liquid crystal panel test equipment given in any they are.
[Claim 5] claims 1-4 characterized by said draining station having a discharge means to discharge to either of the cassettes which contain the liquid crystal panel of the cassette which contains the liquid crystal panel of a defective for the liquid crystal panel which inspection ended on said stage, or an excellent article -- liquid crystal panel test equipment given in any they are.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the liquid crystal panel test equipment which judges the predetermined defects at the time of no switching [of a liquid crystal panel] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.), and the display pattern at the time of lighting automatically in detail about liquid crystal panel test equipment.
[0002]
[Description of the Prior Art] As this conventional kind of liquid crystal panel test equipment, what was indicated by JP,9-218131,A is known, for example.
[0003] This thing picturizes a liquid crystal panel with a recognition camera, after setting this liquid crystal panel on one stage from the cassette which contained the non-inspected liquid crystal panel (injection process) (location **** process).
[0004] Subsequently, after performing alignment of the electrode of a probe and a liquid crystal panel and contacting a probe to a panel electrode, the liquid crystal panel which gave the signal to the probe, turned on the liquid crystal panel, and has subsequently been turned on with the signal generator is picturized with a camera, and it judges the defect and poor lighting of a liquid crystal panel with an image processing system based on the image (inspection process). After termination of this inspection, the liquid crystal panel is discharged to a different cassette according to an inspection result (discharge process).
[0005]
[Problem(s) to be Solved by the Invention] However, when you need two or more processors in order for the latency time great [in order to perform injection of a liquid crystal panel, alignment, inspection, and discharge] in case a liquid crystal panel is taken in and out of a stage to occur upwards by one stage and to conduct two or more inspection if it is in the inspection approach of such a conventional liquid crystal panel, it has also become one with it difficult [to arrange two or more processors] for one stage.
[0006] Then, this invention aims at offering the liquid crystal panel test equipment which can inspect easily a class which makes the layout of a processor easy and is different by distributing a processor to each station while it can process two or more liquid crystal panels in parallel and can shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table.
[0007]
[Means for Solving the Problem] In the liquid crystal panel test equipment which judges the predetermined defect at the time of no switching [of a liquid crystal panel] on the light, and the display pattern at the time of lighting automatically in order that invention according to claim 1 may solve the above-mentioned technical problem an intermission -- with a pivotable table and two or more stages prepared on this table The injection station supplied to said liquid crystal panel on said stage, and the detection station which detects the location of the electrode of the liquid crystal panel thrown into said stage, The inspection station which performs said defect of the liquid crystal panel thrown into said

stage, and the judgment of a display pattern, It has the draining station which discharges the liquid crystal panel which inspection ended from said stage, and is characterized by installing said injection station, a detection station, an inspection station, and a draining station in the perimeter of said table.
[0008] In that case, while being able to process two or more liquid crystal panels in parallel and being able to shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table, a class which makes the layout of a processor easy and is different can be easily inspected by distributing a processor to each station.
[0009] Invention according to claim 2 is set to invention according to claim 1, in order to solve the above-mentioned technical problem. Said injection station A send means to send out one non-inspected liquid crystal panel at a time from the cassette which carries out predetermined spacing isolation, carries out the laminating of the non-inspected liquid crystal panel, and contains it, A direction adjustment means of an electrode to double the direction of the electrode of the non-inspected liquid crystal panel sent out from this send means, and the probe for panel lighting installed in said inspection station, It is characterized by having the positioning means which conveys the liquid crystal panel which is not inspected after this adjustment on said stage, carries out temporary justification, and carries out temporary positioning on a stage.
[0010] In that case, even if it is the case where a non-inspected liquid crystal panel is contained by the cassette in what kind of direction, the direction of the electrode of the non-inspected liquid crystal panel sent out from this cassette can be doubled to a probe with the direction adjustment means of an electrode.
[0011] Moreover, since a liquid crystal panel can be sent out and it can send out automatically toward the direction adjustment means of an electrode from a cassette with a means, while being able to simplify inspection of a liquid crystal panel, inspection time amount can be shortened.
[0012] Moreover, since temporary justification of the liquid crystal panel on a stage can be carried out with a temporary justification means, a liquid crystal panel can be positioned in the location of the arbitration on a stage.
[0013] Invention according to claim 3 is set to invention according to claim 1 or 2, in order to solve the above-mentioned technical problem. Said detection station An image pick-up means to picturize the image of the electrode of the non-inspected liquid crystal panel laid in said stage, It is characterized by having an image-processing means to detect the location of the electrode of a liquid crystal panel from the image picturized by this image pick-up means, and a preservation means to save the location data obtained by this image-processing means.
[0014] In that case, even if rough [compared with the precision of an electrode, the outer-diameter precision of a liquid crystal panel is rough by picturizing the location of the electrode of a liquid crystal panel and / to the precision of an electrode] in the positioning accuracy of the liquid crystal panel in each stage, it becomes possible to perform the electrode of a liquid crystal panel, and alignment of a probe with high precision.
[0015] In invention given in any they are in order that invention according to claim 4 may solve the above-mentioned technical problem -- claims 1-3 -- said inspection station A probe migration means to contact this probe to this electrode after performing positioning of the electrode of a liquid crystal panel, and a probe based on the data stored in the preservation means of said detection station, A signal generation means to impress a driving signal to the electrode of a liquid crystal panel through said probe, It is characterized by having a judgment means to judge the predetermined defect and poor predetermined lighting at the time of no switching [of a liquid crystal panel] on the light from an image pick-up means to picturize the appearance of said liquid crystal panel, and the lighting pattern of an electrode, and the this picturized image data.
[0016] In that case, since it was made to contact this probe to the electrode of a liquid crystal panel after performing positioning of the electrode of a liquid crystal panel, and a probe by moving a probe migration means, It can make it unnecessary to move a stage on a table, in order to set a probe by the electrode. Since the device to which the defect and poor lighting of a panel can be inspected upwards, and a stage is moved becomes unnecessary, without raising the process tolerance of the location of a

stage, a table can be used as a compact.
[0017] in order that invention according to claim 5 may solve the above-mentioned technical problem -- claims 1-4 -- in invention given in any they are, said draining station is characterized by having a discharge means to discharge to either of the cassettes which contain the liquid crystal panel of the cassette which contains the liquid crystal panel of a defective for the liquid crystal panel which inspection ended on said stage, or an excellent article.
[0018] In that case, the liquid crystal panel of an excellent article and the liquid crystal panel of a defective can be automatically contained to a ******** cassette, the time and effort which contains a liquid crystal panel to a cassette can be saved upwards, and the working hours of a sorting activity can be shortened.
[0019]
[Embodiment of the Invention] Hereafter, this invention is explained based on a drawing.
[0020] Drawing 1 -5 are drawing showing 1 operation gestalt of the liquid crystal panel test equipment concerning this invention.
[0021] First, a configuration is explained. the drive motor which 1 is an IKUDEKKU stay bull (table) and does not illustrate this table 1 in drawing 1 -- an intermission -- it is pivotable.
[0022] Moreover, on the table 1, four stages 2-5 in which the liquid crystal panel which is not illustrated, respectively can be laid are formed, and these stages 2-5 are equipped with the suction nozzle which attracts a liquid crystal panel. Moreover, stages 2-5 are exchangeable to the table 1, and, as for stages 2-5, the thing of the configuration of arbitration is attached according to the class of liquid crystal panel.
[0023] Moreover, the injection station 6 which throws a liquid crystal panel into the perimeter of a table 1 on stages 2-5, The detection station 7 which detects the location of the electrode of the liquid crystal panel thrown into stages 2-5, The inspection station 8 which performs the defects at the time of no switching [of the liquid crystal panel thrown into stages 2-5] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.), and the judgment of a display pattern, The draining station 9 which discharges the liquid crystal panel which inspection ended from stages 2-5 is formed, and each of these stations 6-9 are installed at intervals of 90 degrees.
[0024] The injection station 6 is constituted as shown in drawing 2 . In drawing 2 , 10 is a cassette, it has the body with which the laminating of the plate member was carried out in the vertical direction while a cross direction (the direction of arrow-head a) carries out opening of this cassette 10, and the receipt of two or more liquid crystal of it is attained by carrying out predetermined spacing isolation and carrying out the laminating of the non-inspected liquid crystal panel to this plate member.
[0025] Moreover, loading of a cassette 10 is attained at the rise-and-fall means which is not illustrated, and rise and fall of it are attained with this rise-and-fall means.
[0026] Moreover, a cassette 10 is countered, the direct-acting actuator (send means) 11 is formed, and the point of rod 11a with this actuator 11 movable to a cross direction sends out the liquid crystal panel in a cassette 10. Moreover, if a liquid crystal panel is sent out from the inside of a cassette 10, when a cassette 10 goes up or descends with a rise-and-fall means, the liquid crystal panel sent out to a degree will counter rod 11a.
[0027] The liquid crystal panel sent out from the cassette 10 is laid on the rotation stage 12 (the direction adjustment means of an electrode), and this rotation stage 12 doubles the direction of the electrode of a liquid crystal panel, and the probe for panel lighting which was formed in the inspection station 7 and which is mentioned later by rotating in the predetermined direction.
[0028] Moreover, the contact member (positioning means) 13 driven in the direction of X-Y (X-Y flat surface) is formed by the direct-acting actuator which is not illustrated near the rotation stage 12, and this contact member 13 carries out temporary justification of the liquid crystal panel on a stage 2 in the direction of X-Y, and it carries out temporary positioning on a stage 2 while it conveys the liquid crystal panel after adjustment on a stage 2 on a rotary table 12.
[0029] At this time, a suction nozzle is operated, and a liquid crystal panel is attracted and fixed to a stage 2.
[0030] Moreover, the detection station 7 is constituted as shown in drawing 3 . In drawing 3 , 14 is a

CCD camera (image pick-up means), and this CCD camera 14 was laid in the stage 3 (in addition). Although there is no location of stages 2-5 in a fixed location since a table 1 rotates with this operation gestalt Stages 2-5 picturize for convenience the mark prepared in the crosswise (the direction of the outer-diameter side) both ends of the electrode of the liquid crystal panel explained based on the location of explanation shown in drawing 1, or the crosswise both ends of an electrode. The location of an electrode and the cumulative error of electrode width of face calculate the image data picturized by this CCD camera 14 by computer (image-processing means) 15, and the location data which are this result of an operation are stored in the memory (preservation means) built in the computer 15.

[0031] Moreover, the inspection station 8 is constituted as shown in drawing 4 . In drawing 4 , 16 is a probe migration device (probe migration means). The stand 17 movable in the direction (an arrow head e shows) which drives this migration device 16 to two direct-acting actuators which are not illustrated, and intersects perpendicularly with the direction (an arrow head d shows) approached and isolated and its direction d at a table 1, It is prepared in the rise-and-fall cylinder 18 set up by the stand 17 and the rise-and-fall cylinder 18. Consisting of movable probes 19 and presser-foot plates 20 for panel lighting in the direction (the inside of drawing 4 , the vertical direction) which carries out contiguity isolation mutually, this probe migration device 16 operates based on the command signal from a computer 15.

[0032] Moreover, while the back light 22 is formed in the inferior surface of tongue of a table 1, polarizing plates 23 and 24 are formed on both sides of the table 1, and CCD camera (image pick-up means) 25 is formed above the polarizing plate 24.

[0033] CCD camera 25 picturizes the image of the liquid crystal panel when turning on a back light 22, and a computer 15 judges the predetermined defects at the time of no switching [of a liquid crystal panel] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.) based on this image data.

[0034] On the other hand, a computer 15 is based on the information on the location of the electrode of a liquid crystal panel, and the cumulative error of electrode width of face transmitted to the midst which the table 1 is rotating from the memory of a computer 15. Two direct-acting actuators of the probe migration device 16 are driven. At this time It is moved along the extension direction of a probe electrode from the direction isolated from a table 1, and alignment of the probe 19 is carried out so that the cumulative error of the electrode width of face of a liquid crystal panel may be equally distributed to the both sides of a probe 19 and the electrode and probe 19 of a panel may contact certainly.

[0035] In order that a probe 19 and a plate 20 may counter on both sides of a table 4 at this time, while contacting a probe 19 to the electrode of a liquid crystal panel, a liquid crystal panel is put with a plate 20 by making a probe 19 and a plate 20 approach in the rise-and-fall cylinder 18.

[0036] Moreover, the pulse generator as a signal generation means to impress a driving signal to an electrode panel through a probe 19 is formed in the computer 15, and an electrode is made to turn on by impressing a driving signal to a probe 19 with this pulse generator.

[0037] CCD camera 25 picturizes the image at the time of lighting of the electrode of the panel mentioned above, and a computer 15 judges poor lighting of a liquid crystal panel based on this image data. In addition, the computer 15 constitutes the judgment means from this operation gestalt.

[0038] Moreover, although a probe 19 is arranged in the rise-and-fall cylinder 18 bottom and the plate 20 is arranged in the bottom with this operation gestalt, it is because it assumed that this had the electrode of the liquid crystal panel of this operation gestalt in a front-face side. Therefore, what is necessary is to arrange a probe 19 in the rise-and-fall cylinder 18 bottom, and just to arrange a plate 20 in the bottom, when the electrode of a liquid crystal panel is in a rear-face side.

[0039] Moreover, the draining station 9 is constituted as shown in drawing 5 . In drawing 5 , 26 is a direct-acting actuator and this direct-acting actuator 26 discharges the liquid crystal panel which inspection ended on the rotation stage 27 from a stage 5. The rotation stage 27 is pivotable and the liquid crystal panel discharged from the stage 5 is positioned to the cassette 29 for 28 for excellent article receipt, or defective receipt.

[0040] They have the body with which the laminating of the plate member was carried out in the vertical direction while a cross direction (an arrow head b, the direction of c) carries out opening of the cassettes

28 and 29, and the receipt of two or more liquid crystal of them is attained by carrying out predetermined spacing isolation and carrying out the laminating of the non-inspected liquid crystal panel to this plate member. Moreover, loading of cassettes 28 and 29 is attained at the rise-and-fall means which is not illustrated, and rise and fall of them are attained with this rise-and-fall means.
[0041] Moreover, the actuator 21 is formed above the rotation stage 27, it rotates in the cassette 28 or cassette 29 direction with rotation of the rotation stage 27, and after this actuator contacts the conveyance direction back end section of the liquid crystal panel positioned so that it could contain to a cassette 28 or a cassette 29 by the rotation stage 27, the drive of it is attained so that a liquid crystal panel may be conveyed to a cassette 28 or a cassette 29. In addition, drawing 1 and 5 show the location of the knockout section of the actuator 21 when discharging a liquid crystal panel to a cassette 28 side. In addition, the direct-acting actuator 26, the rotation stage 27, and the actuator 21 constitute the discharge means from this operation gestalt.
[0042] Next, the inspection approach of a liquid crystal panel is explained.
[0043] First, if the cassette 10 by which the non-inspected liquid crystal panel was contained is carried in to the injection station 6 from a last process, the liquid crystal panel in a cassette 10 will be sent out to the rotation stage 12 by the actuator 11. At this time, the direction of the probe 19 with which the rotation stage 12 rotated in the predetermined direction, and was established in the electrode and inspection station 7 of a liquid crystal panel is doubled.
[0044] Subsequently, the contact member 13 drives with a direct-acting actuator, and while conveying the liquid crystal panel adjusted on the rotary table 12 by the contact member 13 on a stage 2, after carrying out temporary justification of the liquid crystal panel on a stage 2 in the direction of X-Y and carrying out temporary positioning on a stage 2, a liquid crystal panel is attracted by the suction nozzle on a stage 2.
[0045] Subsequently, a table 1 rotates, a stage 2 moves to the location shown in a stage 3, and a liquid crystal panel moves to an inspection station 7. Moreover, when a stage 2 moves to the location shown in a stage 3, a liquid crystal panel is thrown in in the procedure mentioned above on the stage 2 of the injection station 6.
[0046] The mark to which the liquid crystal panel conveyed at the detection station 7 was prepared in the both ends of the cross direction of the electrode of a liquid crystal panel or the crosswise both ends of an electrode by CCD camera 14 is picturized. After the cumulative error of an electrode location and electrode width of face calculates the image data picturized by CCD camera 14 by computer 15, it is stored in the memory by which the location data which are this result of an operation were built in the computer 15.
[0047] Subsequently, it moves to the location which a table 1 rotates and a stage 3 shows to a stage 4, and a liquid crystal panel moves to an inspection station 8.
[0048] In case this table 1 moves to an inspection station 8, it is based on the information on the location of the electrode of a liquid crystal panel, and the cumulative error of electrode width of face memorized by the memory of a computer 15. The direct-acting actuator of the probe migration device 16 is driven. At this time A probe 19 moves along the extension direction of a probe electrode from the direction isolated from a table 1, distributes equally the cumulative error of the electrode width of face of a liquid crystal panel to the both sides of a probe 19, and positions a probe 19 above the electrode of a panel.
[0049] Subsequently, a back light 22 is turned on and the image of a liquid crystal panel is picturized with CCD camera 25. A computer 15 judges the predetermined defects at the time of no switching [of a liquid crystal panel] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.) based on this image data.
[0050] Subsequently, by making a probe 19 and a plate 20 approach in the rise-and-fall cylinder 18, while contacting a probe 19 to the electrode of a liquid crystal panel, a liquid crystal panel is put with a plate 20.
[0051] Subsequently, impress a driving signal to an electrode panel through a probe 19 with a pulse generator, an electrode is made to turn on, and the image at the time of lighting of the electrode of panel is picturized with CCD camera 25. A computer 15 judges poor lighting of a liquid crystal p

based on this image data.

[0052] After this inspection is completed, a table 5 is made to move a table 4 to a location, and a liquid crystal panel is moved to a draining station 9. Subsequently, the direct-acting actuator 26 is made to drive and a liquid crystal panel is discharged on the rotation stage 27 from a stage 5.

[0053] Moreover, since an excellent article or a defective is judged for a liquid crystal panel by computer 15, a liquid crystal panel can be smoothly contained to the cassette 28 for excellent article receipt, or the cassette 29 for defective receipt -- as -- the rotation stage 27 -- positioning -- the back the bottom After rotating in the cassette 28 or cassette 29 direction with the actuator 21 formed above the rotation stage 27 to rotation of the rotation stage 27, After making an actuator 21 contact the conveyance direction back end section of a liquid crystal panel, a liquid crystal panel is conveyed to a cassette 28 or a cassette 29, it contains to a cassette 28 or a cassette 29, and, subsequently to degree process, this cassette 28 or cassette 29 is taken out.

[0054] Thus, with this operation gestalt, while being able to process two or more liquid crystal panels in parallel and being able to shorten the inspection time amount of a liquid crystal panel by installing two or more stations 6-9 which perform different processing around a table 1, a class which makes the layout of a processor easy and is different can be easily inspected by distributing a processor to each stations 6-9.

[0055] Moreover, the direct-acting actuator 11 which sends out one non-inspected liquid crystal panel at a time from the cassette 10 which carries out predetermined spacing isolation, carries out the laminating of the liquid crystal panel whose injection station 6 is not inspected, and contains it, The rotation stage 12 with which the direction of the electrode of a non-inspected liquid crystal panel and the probe 19 of an inspection station 8 which were sent out from the direct-acting actuator 11 is doubled, Since it constituted from a contact member 13 which conveys the liquid crystal panel which is not inspected after adjustment on a stage 2, carries out temporary justification, and carries out temporary positioning on a stage 2, Even if it is the case where a non-inspected liquid crystal panel is contained by the cassette 10 in what kind of direction, the direction of the electrode of the non-inspected liquid crystal panel sent out from this cassette 10 can be doubled to a probe 19 by the rotation stage 12.

[0056] Moreover, since a liquid crystal panel can be automatically sent out toward the rotation stage 12 from a cassette 10 with the direct-acting actuator 11, while being able to simplify inspection of a liquid crystal panel, inspection time amount can be shortened.

[0057] Moreover, since temporary justification of the liquid crystal panel on a stage 2 can be carried out by the contact member 13, a liquid crystal panel can be positioned in the location of the arbitration on a stage 2.

[0058] Moreover, CCD camera 14 which picturizes the image of the electrode of the non-inspected liquid crystal panel laid in the stage 3 in the detection station 7, Since it constituted from a computer 15 which detects the location of the electrode of a liquid crystal panel from the image picturized by CCD camera 14, and memory which saves the location data obtained by computer 15, Even if the outer-diameter precision of a liquid crystal panel is rough by picturizing the location of the electrode of a liquid crystal panel compared with the precision of an electrode Even if rough [to the precision of an electrode] in the positioning accuracy of the liquid crystal panel in each stages 2-5, it becomes possible to perform the electrode of a liquid crystal panel, and alignment of a probe with high precision.

[0059] Moreover, the probe migration device 16 in which a probe is contacted to the electrode of a liquid crystal panel after performing positioning of the electrode of a liquid crystal panel, and a probe 19 based on the data in which the inspection station 8 was stored by the memory of a computer 15, The pulse generator which impresses a driving signal to an electrode panel through a probe 19, Since it constituted from a computer 15 which judges the predetermined defect and poor predetermined lighting at the time of no switching [of a liquid crystal panel] on the light from CCD camera 25 which picturizes the appearance of a liquid crystal panel, and the lighting pattern of the electrode of a liquid crystal panel, and the picturized image data, After performing positioning of the electrode of a liquid crystal panel, and a probe 19 by moving the probe migration device 16 in the direction of d, and the direction of e, In order to be able to contact a probe 19 to an electrode and to set a probe 19 by the electrode, it can make it unnecessary to move stages 2-5 on a table 1. Consequently, since the device to which the defect and poor lighting of a panel can be inspected upwards, and a stage 1 is moved becomes unnecessary, without raising the process tolerance of the location of stages 2-5, a table 1 can be used as a compact.

[0060] Furthermore, since it constituted from the rotation stage 27 and actuator which are taken out to either of the cassettes 28 which contain the liquid crystal panel of the cassette 29 which contains the liquid crystal panel of a defective for the liquid crystal panel with which inspection ended the draining station 9 on the stage 5, or an excellent article, The liquid crystal panel of an excellent article and the liquid crystal panel of a defective can be automatically contained to the ******** cassette 28 or a cassette 29, the time and effort which contains a liquid crystal panel to a cassette 28 or a cassette 29 can be saved upwards, and the working hours of a sorting activity can be shortened.

[0061] In addition, although the liquid crystal panel laid on one stage every station 6-9 is processed with this operation gestalt, not only this but each two stations 6-9 are formed, respectively, and you may make it prepare eight stages so that it may correspond to each station.

[0062]

[Effect of the Invention] While according to invention according to claim 1 being able to process two or more liquid crystal panels in parallel and being able to shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table, a class which makes the layout of a processor easy and is different can be easily inspected by distributing a processor to each station.

[0063] According to invention according to claim 2, even if it is the case where a non-inspected liquid crystal panel is contained by the cassette in what kind of direction, the direction of the electrode of the non-inspected liquid crystal panel sent out from this cassette can be doubled to a probe with the direction adjustment means of an electrode.

[0064] Moreover, since a liquid crystal panel can be sent out and it can send out automatically toward the direction adjustment means of an electrode from a cassette with a means, while being able to simplify inspection of a liquid crystal panel, inspection time amount can be shortened.

[0065] Moreover, since temporary justification of the liquid crystal panel on a stage can be carried out with a temporary justification means, a liquid crystal panel can be positioned in the location of the arbitration on a stage.

[0066] According to invention according to claim 3, even if rough [compared with the precision of an electrode, the outer-diameter precision of a liquid crystal panel is rough by picturizing the location of the electrode of a liquid crystal panel, and / to the precision of an electrode] in the positioning accuracy of the liquid crystal panel in each stage, it becomes possible to perform the electrode of a liquid crystal panel, and alignment of a probe with high precision.

[0067] Since it was made to contact this probe to an electrode according to invention according to claim 4 after performing positioning of the electrode of a liquid crystal panel, and a probe by moving a probe migration means, It can make it unnecessary to move a stage on a table, in order to set a probe by the electrode. Since the device to which the defect and poor lighting of a panel can be inspected upwards, and a stage is moved becomes unnecessary, without raising the process tolerance of the location of a stage, a table can be used as a compact.

[0068] According to invention according to claim 5, the liquid crystal panel of an excellent article and the liquid crystal panel of a defective can be automatically contained to a ******** cassette, the time and effort which contains a liquid crystal panel to a cassette can be saved upwards, and the working hours of a sorting activity can be shortened.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the liquid crystal panel test equipment which judges the predetermined defects at the time of no switching [of a liquid crystal panel] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.), and the display pattern at the time of lighting automatically in detail about liquid crystal panel test equipment.

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PRIOR ART

[Description of the Prior Art] As this conventional kind of liquid crystal panel test equipment, what was indicated by JP,9-218131,A is known, for example.
[0003] This thing picturizes a liquid crystal panel with a recognition camera, after setting this liquid crystal panel on one stage from the cassette which contained the non-inspected liquid crystal panel (injection process) (location **** process).
[0004] Subsequently, after performing alignment of the electrode of a probe and a liquid crystal panel and contacting a probe to a panel electrode, the liquid crystal panel which gave the signal to the probe, turned on the liquid crystal panel, and has subsequently been turned on with the signal generator is picturized with a camera, and it judges the defect and poor lighting of a liquid crystal panel with an image processing system based on the image (inspection process). After termination of this inspection, the liquid crystal panel is discharged to a different cassette according to an inspection result (discharge process).

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] While according to invention according to claim 1 being able to process two or more liquid crystal panels in parallel and being able to shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table, a class which makes the layout of a processor easy and is different can be easily inspected by distributing a processor to each station.
[0063] According to invention according to claim 2, even if it is the case where a non-inspected liquid crystal panel is contained by the cassette in what kind of direction, the direction of the electrode of the non-inspected liquid crystal panel sent out from this cassette can be doubled to a probe with the direction adjustment means of an electrode.
[0064] Moreover, since a liquid crystal panel can be sent out and it can send out automatically toward the direction adjustment means of an electrode from a cassette with a means, while being able to simplify inspection of a liquid crystal panel, inspection time amount can be shortened.
[0065] Moreover, since temporary justification of the liquid crystal panel on a stage can be carried out with a temporary justification means, a liquid crystal panel can be positioned in the location of the arbitration on a stage.
[0066] According to invention according to claim 3, even if rough [compared with the precision of an electrode, the outer-diameter precision of a liquid crystal panel is rough by picturizing the location of the electrode of a liquid crystal panel, and / to the precision of an electrode] in the positioning accuracy of the liquid crystal panel in each stage, it becomes possible to perform the electrode of a liquid crystal panel, and alignment of a probe with high precision.
[0067] Since it was made to contact this probe to an electrode according to invention according to claim 4 after performing positioning of the electrode of a liquid crystal panel, and a probe by moving a probe migration means, Since the device to which the defect and poor lighting of a panel can be inspected upwards, and a stage is moved becomes unnecessary, without being able to make it unnecessary to move a stage on a table and raising the process tolerance of the location of a stage, in order to set a probe by the electrode, a table can be used as a compact.
[0068] According to invention according to claim 5, the liquid crystal panel of an excellent article and the liquid crystal panel of a defective can be automatically contained to a ******** cassette, the time and effort which contains a liquid crystal panel to a cassette can be saved upwards, and the working hours of a sorting activity can be shortened.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when you need two or more processors in order for the latency time great [in order to perform injection of a liquid crystal panel, alignment, inspection, and discharge] in case a liquid crystal panel is taken in and out of a stage to occur upwards by one stage and to conduct two or more inspection if it is in the inspection approach of such a conventional liquid crystal panel, it has also become one with it difficult [to arrange two or more processors] for one stage.
[0006] Then, this invention aims at offering the liquid crystal panel test equipment which can inspect easily a class which makes the layout of a processor easy and is different by distributing a processor to each station while it can process two or more liquid crystal panels in parallel and can shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table.

[Translation done.]

obtained by this image-processing means.

[0014] In that case, even if rough [compared with the precision of an electrode, the outer-diameter precision of a liquid crystal panel is rough by picturizing the location of the electrode of a liquid crystal panel and / to the precision of an electrode] in the positioning accuracy of the liquid crystal panel in each stage, it becomes possible to perform the electrode of a liquid crystal panel, and alignment of a probe with high precision.

[0015] In invention given in any they are in order that invention according to claim 4 may solve the above-mentioned technical problem -- claims 1-3 -- said inspection station A probe migration means to contact this probe to this electrode after performing positioning of the electrode of a liquid crystal panel, and a probe based on the data stored in the preservation means of said detection station, A signal generation means to impress a driving signal to the electrode of a liquid crystal panel through said probe, It is characterized by having a judgment means to judge the predetermined defect and poor predetermined lighting at the time of no switching [of a liquid crystal panel] on the light from an image pick-up means to picturize the appearance of said liquid crystal panel, and the lighting pattern of an electrode, and the this picturized image data.

[0016] In that case, since it was made to contact this probe to the electrode of a liquid crystal panel after performing positioning of the electrode of a liquid crystal panel, and a probe by moving a probe migration means, It can make it unnecessary to move a stage on a table, in order to set a probe by the electrode. Since the device to which the defect and poor lighting of a panel can be inspected upwards, and a stage is moved becomes unnecessary, without raising the process tolerance of the location of a stage, a table can be used as a compact.

[0017] in order that invention according to claim 5 may solve the above-mentioned technical problem -- claims 1-4 -- in invention given in any they are, said draining station is characterized by having a discharge means to discharge to either of the cassettes which contain the liquid crystal panel of the cassette which contains the liquid crystal panel of a defective for the liquid crystal panel which inspection ended on said stage, or an excellent article.

[0018] In that case, the liquid crystal panel of an excellent article and the liquid crystal panel of a defective can be automatically contained to a ******** cassette, the time and effort which contains a liquid crystal panel to a cassette can be saved upwards, and the working hours of a sorting activity can be shortened.

[0019]

[Embodiment of the Invention] Hereafter, this invention is explained based on a drawing.

[0020] Drawing 1 -5 are drawing showing 1 operation gestalt of the liquid crystal panel test equipment concerning this invention.

[0021] First, a configuration is explained. the drive motor which 1 is an IKUDEKKU stay bull (table) and does not illustrate this table 1 in drawing 1 -- an intermission -- it is pivotable.

[0022] Moreover, on the table 1, four stages 2-5 in which the liquid crystal panel which is not illustrated, respectively can be laid are formed, and these stages 2-5 are equipped with the suction nozzle which attracts a liquid crystal panel. Moreover, stages 2-5 are exchangeable to the table 1, and, as for stages 2-5, the thing of the configuration of arbitration is attached according to the class of liquid crystal panel.

[0023] Moreover, the injection station 6 which throws a liquid crystal panel into the perimeter of a table 1 on stages 2-5, The detection station 7 which detects the location of the electrode of the liquid crystal panel thrown into stages 2-5, The inspection station 8 which performs the defects at the time of no switching [of the liquid crystal panel thrown into stages 2-5] on the light (the blemish on the front face of a panel, impregnation condition of liquid crystal, etc.), and the judgment of a display pattern, The draining station 9 which discharges the liquid crystal panel which inspection ended from stages 2-5 is formed, and each of these stations 6-9 are installed at intervals of 90 degrees.

[0024] The injection station 6 is constituted as shown in drawing 2 . In drawing 2 , 10 is a cassette, it has the body with which the laminating of the plate member was carried out in the vertical direction while a cross direction (the direction of arrow-head a) carries out opening of this cassette 10, and the receipt of two or more liquid crystal of it is attained by carrying out predetermined spacing isolation and carrying

out the laminating of the non-inspected liquid crystal panel to this plate member.
[0025] Moreover, loading of a cassette 10 is attained at the rise-and-fall means which is not illustrated, and rise and fall of it are attained with this rise-and-fall means.
[0026] Moreover, a cassette 10 is countered and it is a direct-acting actuator.

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MEANS

[Means for Solving the Problem] In the liquid crystal panel test equipment which judges the predetermined defect at the time of no switching [of a liquid crystal panel] on the light, and the display pattern at the time of lighting automatically in order that invention according to claim 1 may solve the above-mentioned technical problem an intermission -- with a pivotable table and two or more stages prepared on this table The injection station supplied to said liquid crystal panel on said stage, and the detection station which detects the location of the electrode of the liquid crystal panel thrown into said stage, The inspection station which performs said defect of the liquid crystal panel thrown into said stage, and the judgment of a display pattern, It has the draining station which discharges the liquid crystal panel which inspection ended from said stage, and is characterized by installing said injection station, a detection station, an inspection station, and a draining station in the perimeter of said table.
[0008] In that case, while being able to process two or more liquid crystal panels in parallel and being able to shorten the inspection time amount of a liquid crystal panel by installing two or more stations which perform different processing around a table, a class which makes the layout of a processor easy and is different can be easily inspected by distributing a processor to each station.
[0009] Invention according to claim 2 is set to invention according to claim 1, in order to solve the above-mentioned technical problem. Said injection station A send means to send out one non-inspected liquid crystal panel at a time from the cassette which carries out predetermined spacing isolation, carries out the laminating of the non-inspected liquid crystal panel, and contains it, A direction adjustment means of an electrode to double the direction of the electrode of the non-inspected liquid crystal panel sent out from this send means, and the probe for panel lighting installed in said inspection station, It is characterized by having the positioning means which conveys the liquid crystal panel which is not inspected after this adjustment on said stage, carries out temporary justification, and carries out temporary positioning on a stage.
[0010] In that case, even if it is the case where a non-inspected liquid crystal panel is contained by the cassette in what kind of direction, the direction of the electrode of the non-inspected liquid crystal panel sent out from this cassette can be doubled to a probe with the direction adjustment means of an electrode.
[0011] Moreover, since a liquid crystal panel can be sent out and it can send out automatically toward the direction adjustment means of an electrode from a cassette with a means, while being able to simplify inspection of a liquid crystal panel, inspection time amount can be shortened.
[0012] Moreover, since temporary justification of the liquid crystal panel on a stage can be carried out with a temporary justification means, a liquid crystal panel can be positioned in the location of the arbitration on a stage.
[0013] Invention according to claim 3 is set to invention according to claim 1 or 2, in order to solve the above-mentioned technical problem. Said detection station An image pick-up means to picturize the image of the electrode of the non-inspected liquid crystal panel laid in said stage, It is characterized by having an image-processing means to detect the location of the electrode of a liquid crystal panel from the image picturized by this image pick-up means, and a preservation means to save the location data

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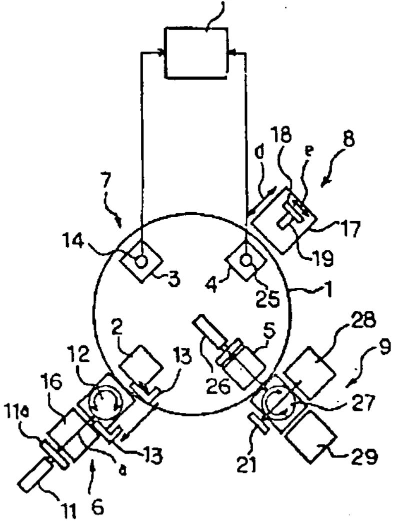
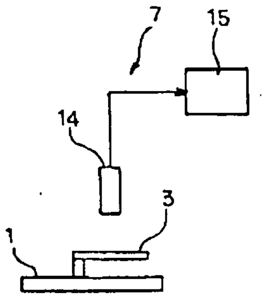
DRAWINGS

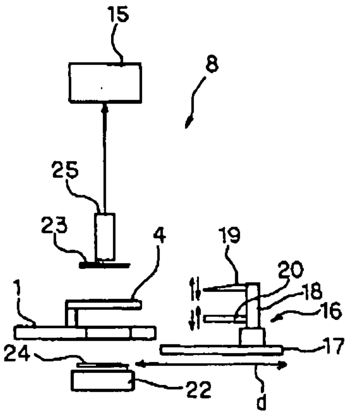
[Drawing 1]



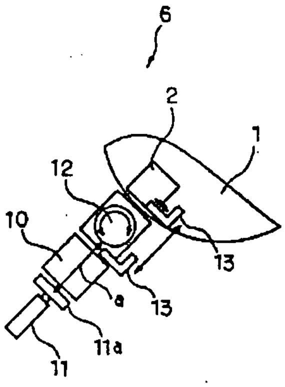
[Drawing 3]



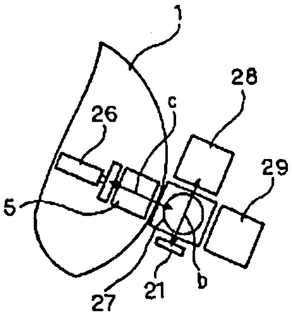
[Drawing 4]



[Drawing 2]



[Drawing 5]



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